

**RESPONSE TO COMMENTS  
ILLINOIS EPA REVIEW  
Jun 18, 2008  
SITE 19 SAMPLING AND ANALYSIS PLAN  
NAVAL STATION GREAT LAKES**

August 18, 2008

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- 1) **Entire Document** - The upper right-hand corner of each page identifies this document as the "Remedial Investigation/Risk Assessment". It would be more accurately identified as the "Sampling and Analysis Plan".

***Response:*** *The title "Remedial Investigation/Risk Assessment" has been replaced with "Sampling and Analysis Plan".*

- 2) **Page 5, Acronyms** - The definition for ASTM should be American Society for Testing and Materials.

***Response:*** *The definition for ASTM has been changed to American Society for Testing and Materials.*

- 3) **SAP Worksheet #3 and #9** - My Title/Role should be listed as Remedial Project Manager.

***Response:*** *The titles have been changed to Remedial Project Manager.*

- 4) **SAP Worksheet #11, page 18** - The DQO process begins with step 2. For completeness, Step 1 should be included if only to say it is irrelevant or unnecessary.

***Response:*** *Step 1 (Statement of Problem) will be added to Worksheet #11 and will state: "Site 19 is the location of a former RTC Rifle Range housed within Building 910. The shooting range was in operation for 55 years until the demolition of Building 910 in 2000. Volatile organic compounds (VOCs), PAHs, and metal (primarily lead) contamination is suspected in the soil and groundwater at the site due to the spent ammunition and the use of solvents for gun cleaning operations. In addition, an active offsite dry cleaning operation is in close proximity to Site 19, and contaminants from this facility may have migrated into the groundwater and soil of Site 19. Also see SAP Worksheet #10 Problem Definition and Appendix C for the Human Health Risk Assessment (HHRA) conceptual site model."*

***The following will be added to Worksheet #10:***

***"In 1998, prior to the demolition of Building 910, two soil samples were collected adjacent to the building. The two soil samples were analyzed for TCLP lead, and both indicated elevated lead concentrations. Sample 'Soil-910-01', collected near the northeast corner of Building 910, yielded a result of 18.3 mg/L while sample 'Soil-910-02', collected on the southern edge of Building 910, yielded a result of 6.16 mg/L (Cape Environmental Management, 1998).***

***Soil samples were also collected in 2001 on Lake County Property located east of Building 910, two of which were collected near Site 19. Sample 4, collected slightly north and east of Site 19, had a lead concentration of 94.7 mg/kg and also had several PAH detections that exceeded residential and commercial criteria based on Illinois EPA Tiered Approach to Corrective Action Objectives (TACO) limits. Sample 12, collected southeast of Site 19, had a lead concentration of 21.1 mg/kg and no TACO exceedances for PAHs (TolTest, 2001)."***

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- 5) **SAP Worksheet #11, page 18** – Step 3 states that a screening-level assessment will be conducted. Details should be provided including goals, equipment calibration, whether quantitative results will be recorded, frequency of laboratory confirmation samples for the field instruments, and sampling pattern and number.

***Response:*** *Details regarding the screening-level assessment are provided in Step 7 and in Worksheets #21 and #22. In an effort to minimize duplication of similar information, no change is recommended for Step 3 – Information Inputs.*

- 6) **SAP Worksheet #11, page 19** – The second bullet item at the top of the page states the groundwater will only be investigated to a depth of 25 feet below ground surface and will target the top of the aquifer. What if the aquifer extends below 25 feet? The entire aquifer depth should be determined, not just the top or merely to 25 feet. Additionally, since at least some of the potential contaminants are dense non-aqueous phase liquids (DNAPLs) such as the chlorinated volatile organic compounds and would be considered “sinkers”, the bottom of the aquifer should not be ignored.

***Response:*** *A previous investigation at (nearby) Site 7 was used as a reference to this investigation plan. This investigation indicated clayey soils to a depth of ~25 feet below ground surface and a surficial aquifer within 20 to 25 feet below ground surface. Well screens will be determined in the field by the FOL but they are anticipated to be screened from 10 to 20 or 15 to 25 feet below ground surface, similar to the wells at Site 7. The words “top of the” will be deleted.*

- 7) **SAP Worksheet #11, page 19** – The third bullet item at the top of the page states the site perimeter will be the horizontal boundary for this study. It may be the initial horizontal boundary for this study, but depending on the collected data results, contamination could lead off-site and require extending the investigation beyond the initial boundary. This should be stated as well.

***Response:*** *Because this investigation is considered to be preliminary in nature, it has been scoped to only include soil and groundwater within the limits of Site 19 as identified on the figures. To clarify this, the following sentence will be added to the end of the Executive Summary and to the end of this bullet: “If the investigation indicates that contamination exists that has not been fully bounded, additional investigative activities may need to be performed after reviewing the results of this investigation.”*

*Also see the additional information that has been added to Worksheet #10 – the response to Comment 4.*

- 8) **SAP Worksheet #11, page 19** – The first paragraph in Step 5 identifies Region 9 and Illinois risk-based criteria as the bases for the preliminary action levels. Region 9 preliminary remediation goals have not been updated for several years and are obsolete. Screening values for Regions 3, 6, and 9 are in the process of being consolidated into contractor-maintained Regional Screening Levels for Chemical Contaminants at Superfund Sites tables. A beta version is available at the following internet address: <http://epa-prgs.ornl.gov/chemicals/index.shtml>. Future screening proposals should

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utilize updated screening values and, although draft, revised values should be considered for Site 19.

***Response:*** *EPA Region 9 screening values will be replaced with values from the Regional Screening Levels for Chemical Contaminants at Superfund Sites table. The text in this paragraph will delete “Region 9” and replace it with “Regional Screening Levels for Chemical Contaminants” and similar changes/additions will be made on Worksheet #15 and Appendix C.*

- 9) **SAP Worksheet #11, page 19** – In the last paragraph of Step 5, there is discussion regarding the nature and extent “within the site perimeter.” Determination of nature and extent cannot be bounded prior to the investigation. The analytical results of the investigation will determine where the nature and extent of contamination lies. It may or may not be within the site perimeter.

***Response:*** *See response to Comment 7. No other changes will be made based on this comment.*

- 10) **SAP Worksheet #11, page 19** – In the last paragraph of Step 5, the discussion regarding the use of spatial patterns for decision making and factors to be considered is confusing. Please clarify what is being stated here. It appears to be laying the groundwork for not conducting a complete investigation, but only conducting field work within the already determined boundary of the site, regardless of what the data might show. That would not be acceptable. In order to properly determine nature and extent, any contamination identified would need to be further investigated until analytical results have been obtained that reveal the entire horizontal and vertical extent of contamination above the agreed-upon screening levels.

***Response:*** *The paragraph was not laying the groundwork for not conducting a complete investigation (the sentence does say “for future investigations, if any”) but we agree it is confusing. The last 2 sentences will be revised to “The spatial patterns of contamination will be documented and made available for future investigations, if needed. Factors to be considered will be the overall contamination pattern compared to the PALs (i.e., background concentration and risk-based screening levels developed during the HHRA) and estimates of where chemical concentration gradients appear to decrease to concentrations less than the PALs.”*

- 11) **SAP Worksheet #11, page 19** – In the last paragraph on page 19, under Step 6, it is stated that “the manner of release (i.e., aerial deposition) suggests that lead concentrations will be widely scattered and therefore will not be present in concentrations greater than the PAL.” Although this statement sounds logical, it is merely an assumption. According to an electronic mail message from Mr. Bryan Holtrop, dated 6/11/2001, regarding a soil pile created on this site in 2001, “However, we did collect some samples of in-situ soil on the site. Of that sampling we got two samples that came back with total lead levels of 2120 mg/kg and 444 mg/kg, and SPLP lead levels of 0.122 mg/l and 0.236 mg/l”. At other Navy sites similar to this one, the lead contamination was not as heterogeneous as first thought and there was a large area

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determined to be above the PAL that required a removal action. Suggest not making such a statement here.

***Response:*** *The following paragraph will replace the first paragraph of Step 6: “Based on past experience with lead distributions in soil, lead was assumed to be the most heterogeneously distributed potential contaminant. It is also the most important potential contaminant because of its direct link to site operations and the quantities in which it was potentially released. Nevertheless, the manner of release (i.e., aerial deposition) suggests that lead concentrations will be widely scattered. Whether this is true or not remains to be determined and collecting enough samples to demonstrate conclusively that an unacceptable risk does or does not exist is the goal of this study.”*

- 12) **SAP Worksheet #11, page 20** – In the fifth paragraph, statistical error rates are set. By convention for risk assessment purposes, false rejection and acceptance rates are typically given as 5 and 10% (or 10 and 5%, in this case), respectively. Relaxed standards for this site should be fully justified. Additionally, in the last sentence of this paragraph, the type two error has been redefined and should be identified as “alpha”.

***Response:*** *For purposes of deciding the need for remedial actions, the Navy would disagree that the convention for Type I and Type II rates are typically 5 and 10%, respectively. Determination of Type I and Type II error rates at a site is contingent on the degree of potential health and environmental concerns at a site. At this site, the null hypothesis (H<sub>0</sub>) is that the site does not warrant corrective action (i.e., site is clean). Selecting an alpha of 20%, i.e., taking action at a site when an action is not warranted, does not seem to be that relaxed; in contrast, it is more protective of human health and the environment relative to selecting an alpha of 10%. Selecting a beta of 10%, i.e., not taking action when an action is warranted, may be more relaxed than using a beta of 5%, but this is certainly not out of the typical ranges recommended by EPA Data Quality Objective Guidance, especially when it is suspected that the site is not significantly contaminated.*

*In addition, the last sentence of the referenced paragraph will be corrected to state: “We therefore, set the potential for the second error at 20 percent and call this value alpha.”*

- 13) **SAP Worksheet #11, page 20** – In the middle of the page, the Project Action Level (PAL) for lead is listed as 400 mg/Kg (ppm). For the soil ingestion and inhalation exposure routes that is the readily accepted screening value. However, for the soil component of the groundwater ingestion exposure route, the Illinois EPA Tiered Approach to Corrective Action Objectives (TACO) screening level is 0.0075 mg/L. This value is calculated using the TCLP or SPLP testing methods. Alternatively, if pH data for each sample or borehole will be collected, the pH-specific soil remediation objective may be used. By defaulting to the 400 ppm value, the soil component of the groundwater ingestion exposure route is not addressed. This is normally unacceptable. However, when used strictly for the purpose of calculating the required number of samples to collect at this site, as it is here, that value is allowable.

***Response:*** *Comment is noted; no change is recommended in response to comment.*

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- 14) **SAP Worksheet #11, page 20** – Please explain where the values of 600 mg/kg, for the maximum expected value, and 6, for the possible range of concentrations, were obtained and provide justification for their use. As noted above, prior sampling yielded at least one result above the 600 mg/kg value listed here.

***Response:*** *To evaluate this site, the null hypothesis is that the site will have lead concentrations less than the action level of 400 mg/kg. Therefore, the selection of 600 mg/kg as a maximum detected lead concentration seemed to be a reasonable estimate in light of the fact that high lead concentrations are not expected. This value was used for the purposes of estimating a standard deviation in the absence of actual site data. The concentration of 2,120 mg/kg referenced in Comment 11 was in a stockpile of soil that was removed from the site and was not known during the preparation of the UFP QAPP/SAP.*

*The estimate of a standard deviation is needed to calculate the minimum number of samples required to meet the alpha and beta requirements discussed in Response 12. The value, 6, is not the range of concentrations, but a divisor of the range as defined by the fact that 99% of the range of data is within 3 standard deviation units above and below the mean; hence, dividing the range by 6 provides an estimate of the standard deviation. No change is recommended in response to comment.*

- 15) **SAP Worksheet #11, page 21** – Under Step 7, the surface soil is defined as 0-2 feet below ground surface. Normally, a 0 to 2-6 inch depth is considered the surface soil. However, since following the demolition of Building 910 an additional 12 inches of topsoil was reportedly placed over portions or the entire site, the added depth is considered acceptable in this instance. Based upon the Field Operations Leader's best judgment, though, if an area of the site can be determined to be not impacted by the additional 12 inches of topsoil, the sample should be collected from the 0 to 2-6 inch depth rather than 0-2 feet. Likewise, if the opposite is true and it can be confidently determined that the top 12 inches was placed post demolition, the sample should be collected from the 12 to 14-18 inch depth rather than 0-2 feet. This should be clearly stated in this section. Also, the subsurface depth should extend from the surface soil interval to the lower extent of contamination or groundwater. Depending on the field screening results, it may be necessary to identify shallow and deep subsurface intervals.

***Response:*** *The following will replace the first sentence of Step 7: "Twenty (20) soil borings will be drilled, and a surface soil sample will be collected from each of the boring locations. Surface sample depth will be based upon the FOL's best judgment; if an area is determined to not have been covered with post-demolition topsoil or gravel, samples will be collected from 0 to 6 inches below ground surface. Otherwise, the samples will be collected from the field determined depth of pre-demolition ground surface (plus an additional 6 inches below the pre-demolition surface)."*

*The paragraph describing the subsurface soil sampling will be revised to "In addition to the 20 surface soil samples, 15 subsurface soil samples will be collected. Subsurface soil samples will be collected in 2 foot intervals (2 to 4 feet, 4 to 6 feet,*

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*etc.) and each 2 foot interval will be screened in the field with the PID and XRF field instrumentation. Subsurface VOC and PAH samples for laboratory analysis will be collected from the intervals in each boring that yields the highest field screening results (based on PID readings). Subsurface Pb samples for laboratory analysis will be collected from each boring interval yielding a field screening result (based on XRF readings) between 100 and 400 ppm. If field screening results are less than 100 ppm or non-detect for Pb and VOCs, respectively, random sampling will be conducted to collect the 15 samples to conduct a risk assessment. Subsurface soil sampling will stop when the PID and XRF screening results are non-detect and less than 100 ppm, respectively.*

*Fewer subsurface soil samples will be collected because the conceptual site model for the distribution of the contaminants at the site will be limited to specific areas, such as near drains or doors for the VOC and PAH contamination and near the ventilation fans for the Pb. If present, the VOC and PAH contamination should be at depth in the area of the drains, the VOC and PAH contamination should be at the surface near the doors, and the Pb contamination should be at the surface as stated above. If present, the soil sampling design for the VOC and PAH contamination will be biased towards locations with the highest concentration of VOCs and PAHs with the analysis of samples that have the highest PID field screening results (the risk analysis with this data will also be biased high). The soil sampling design for the Pb contamination will be biased towards the regulatory criteria for Pb and the excavation extent of the contamination. If random sampling is conducted, the soil sampling design will remove the bias of sampling "contaminated" samples."*

- 16) **SAP Worksheet #11, page 21** – The second paragraph states that, based on FOL judgment, additional borings may be drilled and up to 10 additional samples may be collected. Upon what information will the FOL base his judgment? Please provide this information or at least a few examples of possible reasons for collecting those additional samples.

***Response:*** *No additional borings or subsurface soil samples are anticipated. Reference to the 10 additional subsurface soil samples will be removed from the document.*

- 17) **SAP Worksheet #11, page 21** – The second paragraph discusses field screening results. How will those results be documented? Will they be used for comparison to laboratory results for those samples that are sent to the lab? Please explain.

***Response:*** *Field screening results will be provided as an appendix to the RI/RA report, and will include copies of FOL field notes, PID screening results, XRF data printouts, and boring logs. Also see the response to Comment 15 related to how the field screening results will be used. No change is recommended in response to comment.*

- 18) **SAP Worksheet #15.1** – For any compound that the laboratory reporting limit does not achieve the Project Action Level, the analytical result must be reported down to the

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method detection level, regardless of the reporting level. There should be a note added to clearly state this.

***Response:*** *The following note will be added to Worksheet #15.1: Nondetected metals results will be reported to the Instrument Detection Limits. Nondetected organic compound results will be reported to the Quantitation Limit, with positive results reported to the MDLs. Positive results reported at concentrations between the Quantitation Limit and the MDL will be qualified with a "J".*

- 19) **SAP Worksheet #15.1** – The analytes on this table are not listed in alphabetical order. This makes finding a specific compound or verifying the listed values difficult. Please consider reorganizing the analytes or explain why they are listed in this manner.

***Response:*** *The analyte list will be re-arranged in alphabetical order.*

- 20) **SAP Worksheet #15.1** – Worksheet 15.1 lists screening values, for aqueous and solid matrices, from Illinois TACO and Region 9. A "spot-check" review of Worksheet 15.1 was performed. The Region 9 and TACO values should not be confined to the "Residential Soil" and "Industrial Soil" levels but should also include the "Migration to Groundwater" soil values, when available. In the case of 1, 3-dichloropropene, the minimum value should be reported as 0.2 µg/kg. Additionally, for the contaminant mercury, the minimum TACO solid matrix value should be corrected from 6400 µg/kg to 100 µg/kg, the value in TACO to protect construction workers from inhalation exposure to elemental mercury. Also, the reported Region 9 minimum solid matrix value of 100 µg/kg could not be verified in the Region 9 October 2004 PRG tables. All entries on Worksheet 15.1 should be reviewed and corrected as needed.

***Response:*** *The values for 1,3-dichloropropene and mercury have been revised as per the comment. The Worksheet has been reviewed and corrected. Changes in cells specific to this comment have been are highlighted.*

*The following Illinois EPA sources were used to determine the minimum TACO values:*

- *TACO Groundwater Remediation Objectives (Section 742 Table E) for Class 1 Groundwater*
- *Groundwater Remediation Objectives for Chemicals Not Listed in TACO (May 1, 2007).*
- *Section 742 Table A, Tier 1 Soil Remediation Objectives for Residential Properties (Ingestion, Inhalation, or Soil Component of Groundwater Ingestion Route)(Online July, 2008).*
- *Section 742 Table B, Tier 1 Soil Remediation Objectives for Industrial/Commercial Properties (Ingestion, Inhalation, or Soil Component of Groundwater Ingestion Route) (Online July, 2008).*
- *Section 742 Table C, pH Specific Soil Remediation Objectives for Inorganics and Ionizing Organics for the Soil Component of the Groundwater Ingestion Route (Class I Groundwater) for Metals, pH Range 7.25 - 7.74.*

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- *Soil Remediation Objectives for Chemicals Not Listed in TACO (May 1, 2007).*
- *Revisions to chemicals not listed in TACO (June 1, 2008).*

*The value reported as the Region 9 PRG for mercury (100 mg/kg) was referenced incorrectly. This value was an EPA Soil Screening Level for Migration from Soil to Groundwater (DAF 1) calculated online from [http://risk.lsd.ornl.gov/calc\\_start.shtml](http://risk.lsd.ornl.gov/calc_start.shtml).*

*The Worksheet has also been reviewed and corrected for USEPA Criteria. The following USEPA sources were used to determine the minimum USEPA values:*

- *USEPA Regional Screening Levels for Chemical Contaminants at Superfund Sites online at <http://epa-prgs.ornl.gov/chemicals/index.shtml>.*
- *USEPA Generic Soil Screening Levels for Migration to Groundwater (dilution/attenuation factor of 1) calculated by Tetra Tech NUS, Inc. online at [http://risk.lsd.ornl.gov/calc\\_start.shtml](http://risk.lsd.ornl.gov/calc_start.shtml) using methodology from the USEPA's Soil Screening Guidance (USEPA, July 1996).*
- *USEPA Generic Soil Screening Levels for Migration from Soil to Air calculated online at [http://risk.lsd.ornl.gov/calc\\_start.shtml](http://risk.lsd.ornl.gov/calc_start.shtml).*

- 21) **SAP Worksheet #15.1** – Worksheet 15.1 evaluates the adequacy of analytical methods to detect critical environmental concentrations of the contaminants. The subject worksheet compares screening values to the analytical method detection limit (MDL). The correct evaluation is to compare environmental concentrations to probable quantitation limits (PQL) or similar realistic values.

***Response:*** *The comparison of screening values to the laboratory's MDLs was done according to Navy policy. Tetra Tech requires the laboratory to report results greater than the MDL but less than the Quantitation Limit as estimated values and requires the laboratory qualify these results with a "J" (see the response to Comment 18).*

- 22) **SAP Worksheet #15.1** – Illinois EPA was unable to determine from where several of the Illinois TACO Criteria listed in this table were obtained. Please review the table for accuracy and revise where necessary.

***Response:*** *The table has been reviewed and corrected. See response to Comment #20.*

- 23) **SAP Worksheet #15.1** – There are several instances for both soil and water where the PAL Reference identifies TACO or EPA R9 when it should identify the other, based upon using the most conservative value as the reference. Please review the table and revise as necessary.

***Response:*** *The table has been reviewed and corrected, identifying the source of the minimum value. Note that the EPA R9 designation has been changed to EPA because the values are USEPA Regional Soil Screening Values rather than Region 9 values.*



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- 24) **SAP Worksheet #15.1** – A solid matrix TACO criterion of 3,100 mg/kg is available for 4-methyl-2-pentanone (methyl isobutyl ketone) and should be included here.

***Response:*** *The TACO criterion for 4-methyl-2-pentanone will be added to Worksheet #15.1.*

- 25) **SAP Worksheet #15.2** – In the header for the third column (Project Action Limit), footnote #2 is referenced. The footnote explanation should be provided plus the absence of footnote #1 should be explained.

***Response:*** *Footnote #2 will be changed to #1, and the following footnote will be added to Worksheet #15.2: “<sup>d</sup>Project Action Limits for IDW management are based on disposal requirements in RCRA 40 CFR 261.24.*

- 26) **SAP Worksheet #16** – The dates listed for the Draft and Final RI/RA Report appear to be reversed as the final report anticipated dates are before the draft anticipated dates.

***Response:*** *Worksheet #16 will be updated to reflect current anticipated dates.*

- 27) **SAP Worksheet #17 and Figure 17-1** – Suggest placing sampling points near the northeast and southeast storm sewer collection points. It would be expected that contaminated surface soil may move toward these locations.

***Response:*** *Figure 17-1 will be updated as suggested and the following paragraph will replace the surface/subsurface sample rationale: “The greatest metal concentrations (mainly lead) in the soil are generally expected to be in the samples collected along the inside the western wall of the former building (location of the targets and soil floor) and areas outside the western wall of the former building (location of the exhausts for the ventilation system). The greatest chemical concentrations (mainly petroleum-based chemicals) in the soil are generally expected to be in the samples collected near the areas of the former gun repair rooms, in areas where the petroleum based cleaning fluids may have been discarded along the eastern portion of the building or through the sanitary sewer system located in the southeastern portion of the former building, and in areas near the northeast and southeast storm sewer collection points. Possible chlorinated VOC contamination may cross the boundary line from the dry cleaning facility located to the southwest of Site 19. The primary reason for collecting soil samples is to obtain current site data and to characterize nature and extent of contamination. Figure 17-1 shows the locations of the proposed soil boring samples. Sample locations were selected based on professional judgment and consist of a grid system within the former building outline and a biased sampling approach near the ventilation system along the western edge of the former building and near the northeast and southeast storm sewer collection points.”*

- 28) **SAP Worksheet #18** – See previous comment regarding the depth of surface soil samples.

***Response:*** *The following note will be added to Worksheet #18: “Surface sample depth will be based upon the FOL’s best judgment; if an area is determined to not have been covered with post-demolition topsoil or gravel, samples will be collected from 0 to 6 inches below ground surface. Otherwise, the samples will be collected*

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*from the field determined depth of pre-demolition ground surface (plus an additional 6 inches below the pre-demolition surface)."*

- 29) **SAP Worksheet #18** – Field instrument confirmation samples should be included here.  
**Response:** *No field instrument confirmation samples will be collected; no change is recommended in response to comment.*
- 30) **SAP Worksheet #18** – The note at the bottom of page 47 states that additional screening sampling locations may be collected, but appears to state that only the listed quantities in the table will be submitted for laboratory analysis. This is contrary to Step 7 of the DQO Process on page 21 where it states, "Based on FOL judgment, additional borings may be drilled to better delineate site contamination, and up to 10 additional samples may be collected and analyzed for VOCs, PAHs, and metals." Illinois EPA believes the note on this worksheet should be changed to match Step 7.  
**Response:** *The note will be removed. See the response to Comment 16.*
- 31) **SAP Worksheet #18** – The note at the bottom of page 48 states that the monitoring wells will be stick up with protection using 3 pipes filled with concrete and painted yellow. Is this the best choice for this site? Wouldn't flush mounted wells be better suited? Please provide the justification for using stick up type wells here.  
**Response:** *The last sentence of the note will be replaced with the following: "Depending on location, flush mount or stick up wells will be installed. Stick up wells will be installed in locations that are deemed likely to be used for storage purposes, and each well will be protected by 3 pipes filled with concrete and painted yellow."*
- 32) **SAP Worksheet #19** – The last line of the table lists a single 8 oz glass container for soil grain size, but the very next column lists sample volume as 84 oz. Obviously, this is a typo. Please review and revise as necessary.  
**Response:** *The sample volume will be corrected to 8 oz..*
- 33) **Appendix A** – In SOP Number SA-1-1 on page 19, the stabilization parameters for ground water include pH, specific conductance, temperature, turbidity, and dissolved oxygen. Illinois EPA believes oxidation-reduction potential (ORP) should also be included here..  
**Response:** *The TtNUS and USEPA Environmental Response Team SOPs for monitoring well development after the well is installed do not use ORP to determine when sufficient development has been performed. ORP is included as a monitoring parameter but not included in the well stabilization parameters because of the difficulty in obtaining stable readings, even when aquifer representativeness is considered to be adequate because of probe or instrument instability for DO or ORP. No change is recommended in response to comment.*
- 34) **Appendix B** – In Section 1.2, the second listing of the telephone number for Howard Hickey appears to be incorrect.  
**Response:** *The telephone number will be corrected to 847-688-2600.*

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- 35) **Appendix B** – In Section 4.0, shouldn't the photo ionization detector (PID) analysis be listed as one of the tasks to be performed?

**Response:** *The PID analysis will be listed as a separate bullet below the XRF field analysis. The following will be added*

- *Photo-ionization Detector (PID) field analysis*

- 36) **Appendix B** – In Section 6.1, polynuclear aromatic hydrocarbons (PAHs) should be identified as primary contaminants. They should also be included in Table 6-1.

**Response:** *PAHs will be identified as primary contaminants and will be included in Table 6-1. The following will be added to the table*

Substance	CAS No.	Air Monitoring/Sampling Information	Exposure Limits	Warning Property Rating	Physical Properties	Health Hazard Information	
PAHs	(CAS Numbers vary depending on specific compound )	PID 1 P of 8 97 eV, relative response ratio unknown  FID: Response factor unknown but given the substances flammability , detection by FID can be anticipated	Air sample using filter + sorbent (2-µm, 37-mm PTFE + washed XAD-2, 100 mg/50 mg), gas chromatography-cappillary column-flame ionization detection detection, Sampling and analytical protocol shall proceed in accordance with NIOSH Method 5515	General PAHs:  Most PAHs have no established exposure limits. Other Coal Tar Pitch Volatiles / PAHs such as chrysene and benzo(a)pyrene have an exposure limit of 0.2 mg/m <sup>3</sup> (OSHA and ACGIH)  0.1 mg/m <sup>3</sup> - (NIOSH) Creosote / Cresol OSHA: ACGIH 5 ppm NIOSH: 2.3 ppm IDLH 80 mg/m <sup>3</sup>	Adequate - use a full-face air-purifying respirator with organic vapor / dust/mist cartridge up to 250 ppm. Cresol has an Odor Threshold of 0.00005-0.00079 ppm  <b>Recommended gloves:</b> Viton >96 00 hrs, butyl rubber >90 00 hrs, neoprene >4 50 hrs	Properties of various PAHs vary depending upon the specific compound.  <b>Boiling Pt:</b> 376-397°F, 191-203°C <b>Melting Pt:</b> 52-96°F, 10.9-35.5°C <b>Solubility:</b> Insoluble <b>Flash Pt:</b> 178°F, 81°C <b>LEL/LFL:</b> Not available <b>UEL/UFL:</b> Not available <b>Vapor Density:</b> 3.72 <b>Vapor Pressure:</b> 1 mmHg @ 100-127°F, 38-53°C <b>Specific Gravity:</b> 1.030-1.038 <b>Incompatibilities:</b> Nitric acid, oleum, chlorosulfonic acid, oxidizers <b>Appearance and Odor:</b> Yellowish or colorless, flammable, oily liquid (often brownish because of impurities or oxidation)	Regulated based on effects on respiratory tract and skin irritation. Other effects may include eye irritation and central nervous system, disturbances. Acute exposures may result in difficulty breathing, respiratory failure and skin and eye irritation and burns. Chronic exposure may damage the liver, kidneys, lungs and skin and cause photosensitivity  IARC, NTP, NIOSH, ACGIH, and the EPA list some PAHs such as benzo(a)pyrene as a potential carcinogen (ARC 2A, NTP-2, ACGIH TLV-A2, NIOSH-X, EPA-B2)

- 37) **Appendix C** – In Section 1.2.1, the first bullet references the TACO remediation objectives. The additional chemicals included in the web-based tables titled "Chemicals not in TACO Tier I Tables" should also be used and referenced.

**Response:** *The following Illinois EPA references will be added to Section 1.2.1:*

- *Groundwater Remediation Objectives for Chemicals Not Listed in TACO (May 1, 2007).*
- *Soil Remediation Objectives for Residential Properties, Non-TACO Chemicals (May 1, 2007).*
- *Soil Remediation Objectives for Industrial/Commercial Properties, Non-TACO Chemicals (May 1, 2007).*
- *Revisions/Additions to Tables for Non-TACO Chemical Remediation Objectives (June 1, 2008).*

- 38) **Appendix C** – In Section 1.2.1, the third bullet includes a web link that would not work. Please provide an updated link. Suggest that the criteria developed from the third bullet source be included in Worksheet 15.1.

**Response:** *The following link will replace the link in the text:*

**[http://rais.ornl.gov/calc\\_start.shtml](http://rais.ornl.gov/calc_start.shtml)**

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*Worksheet 15.1 will be revised to show the specific criteria developed from the Soil Screening Guidance. This will include values for migration from soil to groundwater and migration from soil to air, as well as the EPA Regional Screening Levels for Chemical Contaminants. The revised table will be added as a new table in Appendix C.*

- 39) **Appendix C** – On page C-6, redefine surface soil as the 0 to 2-6 inch interval.  
*Response: The 2<sup>nd</sup> and 3<sup>rd</sup> sentences of page C-6 will be replaced with the following: “Surface soil will be defined as soil collected from 0 to 6 inches below ground surface (bgs). If an area is determined to not have been covered with post-demolition topsoil or gravel, samples will be collected from 0 to 6 inches bgs. Otherwise, the samples will be collected from the determined depth of pre-demolition ground surface (plus an additional 6 inches below the pre-demolition ground surface). Subsurface soil will be defined as soil collected from depths greater than 6 inches bgs.”*
- 40) **Appendix C** – In Section 1.2.2, second paragraph, the lead in groundwater criterion should be revised to the Illinois groundwater standard of 7.5 µg/L.  
*Response: The criterion will be revised to the Illinois groundwater standard.*
- 41) **Appendix C** – All of the chemicals listed in Section 1.2.3 as examples where surrogate toxicity values might be used are included in the “Chemicals not in TACO Tier I Tables” pages on the IEPA web site. The web table values should be utilized before surrogates are considered.  
*Response: Section 1.2.3 will be replaced with the following: “The essential nutrients calcium, magnesium, potassium, and sodium will not be selected as COPCs for Site 19. These inorganic chemicals are naturally abundant in environmental matrices and are only toxic at high doses. In addition, because of the lack of toxicity criteria, risk-based COPC screening levels are not available for some chemicals. Appropriate surrogates will be selected (with approval from the Illinois EPA) for some of these chemicals based on similar chemical structures.”*
- 42) **Appendix C** – Section 2.3 should be revised to include the definition of the exposure point concentration (EPC) for the vapor intrusion route of exposure. We suggest the maximum soil and groundwater concentrations.  
*Response: Use of the highest groundwater concentrations for risk characterization is specified in the 2<sup>nd</sup> bullet on page C-15. As per USEPA vapor intrusion guidance, bulk soil is not evaluated using the Johnson and Ettinger model (OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathways from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), November 2002, Page 29). Therefore, revisions to the text are not recommended regarding the EPCs for vapor intrusion.*
- 43) **Appendix C** – Disagree with the Section 2.4.1 bullet at the top of page C-18. All chemical-specific dermal absorption factors (AF) should be used for organic

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contaminants. This includes the AF of 0.13 for PAHs and 0.1 for all other semivolatiles.

**Response:** *AFs for PAHs and semivolatiles will be added to the text. Please note that AFs are not currently available for volatiles and most metals.*

- 44) **Appendix C** – In the second paragraph on page C-28, correct the lead in groundwater criterion to the Illinois groundwater standard of 7.5 µg/L.

**Response:** *The criterion will be revised to the Illinois groundwater standard.*

- 45) **Appendix C** – In Table 2, for all receptors, revise the outdoor inhalation exposure route to read, “Inhalation of Vapor/Dust (from soil)”.

**Response:** *The exposure route will be revised as suggested.*

- 46) **Appendix C** – At the bottom of Table 3, please add definitions for the second column of abbreviations.

**Response:** *The definitions will be added as suggested.*

- 47) **Appendix C** – On Tables 3 and 4, correct the Occupational Worker EF values to 250 and 219 days/year, respectively, explain the derivation of the Construction Worker PEF value, and correct the units for the exposure parameter “t\*” to “(hours)”.

**Response:** *Tables 3 and 4 will be revised according to the comment and the Soil Screening guidance and calculation of the PEF for the construction worker will be added as an attachment to Appendix C.*

*Note – other minor changes were made to the document based on comments from the Navy. All changes have been highlighted or tracked in ‘track change’ mode to assist with the review process.*